Future energy options to 2020
(“Zukunftsenergie 2020”)

Basic elements for a sustainable energy policy concept

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(Translation from German)
Future energy options to 2020 -
Basic elements for a sustainable energy policy concept

1. The years until 2020 are a decisive period for defining the strategic direction for sustainable energy supply in a globalized world up to the year 2050.

2. Our “basic law” in terms of energy policy, is the “triangle of energy policy objectives” with its three components of environmental compatibility, security of supply and economic efficiency. These targets need to be in a well-balanced relationship.

3. Centralized and conventional electricity generation will remain indispensable for the foreseeable future. Dispersed generation and application technologies are gaining in importance.

4. Energy efficiency, energy services and renewable energies will be developed further as a core business for all supply companies.

5. Natural gas is a sustainable and reliable energy source which serves as an important link to the 2050 energy world.

6. The German energy industry will continue to make investments in sustainable and innovative projects.

7. Politics, business and science must jointly get themselves more involved in our society with a view to promoting increased investments, innovations and research in the field of energy supply.

8. Sustainable energy supply needs a stable framework in terms of energy policy without preference for certain technologies and on the basis of non-discrimination in energy markets, while the interests of security of supply must be taken into consideration by state regulation. This applies to Germany as well as to the entire European Union.

9. Climate protection policy, too, needs to be efficient. Measures which ensure optimum effects on climate protection achievable with scarce capital are to be preferred and coordinated at an international level.

10. Furthermore, national climate protection policy can only be successful if joint efforts are undertaken at an international level.

11. The German energy industry is aware of its responsibility for its customers, its companies and the persons employed there, for the national German economy and last but not least the environment.

Therefore, we will use the time left until 2020 to realize our project on future energy options to 2020 (“Zukunftenergie 2020”) and produce energy for the future. It is up to us to gain from this future energy our motivation for the next decade.

The German energy industry has the technical expertise and the economic power to contribute to a sustainable pattern of future energy supply. Together we can cope with the great challenges ahead and establish a balance between climate protection, security of supply and economic efficiency. We are prepared to tackle these tasks.
I. Our motivation

2009 is an important year of decisions. At the end of the first decade in the 21st century, we have to define in Germany the strategic political and economic direction which will have a sustained influence on our country’s future, our national economy and on our way of life. In particular the energy policy of our country needs a clear-cut guide for the next decade and beyond, based on the exchange of views and experience with our neighbours in Europe and our partners in the world.

The decisions to be taken in this context are of prime importance irrespective of how we are coping with the current economic crisis that is unparalleled in the history of the Federal Republic of Germany. These decisions will have an effect on more than one economic cycle and determine the frame of our energy supply during the next decade – and perhaps even far beyond. On the horizon of 2050, there appears a sustainable energy supply in a globalized world.

The current worldwide trends in energy supply and consumption must be led in a direction that allows for future needs. With a view to ensuring that even in 2050 Germany will have a reliable energy supply at reasonable prices associated with a largely CO2-neutral, efficient and environmentally compatible supply system, it is necessary to still take decisions during this decade and take action during the next.

The German energy industry takes up the challenges of climate protection. We consider it our task to bring the reduction of greenhouse gas emissions in line with a modern industrial society and service economy. We consider a reduction of greenhouse gas emissions in Germany by up to 30 percent by the year 2020 to be very ambitious task which is nevertheless feasible. Many of the technologies required to this end are already available today, but not all of them
are economically efficient. Nevertheless, the German energy industry considers that the subjects of energy efficiency and climate protection provide opportunities to move things forward in our country so as to enable future requirements to be met.

We would like to give an answer to the following question on behalf of the energy sector: “What does energy supply in the future look like?” The aim is to provide common answers of politics, business and society to this question and take joint action for their implementation. By means of the basic elements described in this paper, we want to show a framework for the realization of our project “Zukunftsenergie 2020” (Future energy options to 2020).

This paper is taking a look at the period up to the year 2020 and partly beyond. Up to that year, the trends described below concerning the environment, technology and customer behaviour will develop or intensify. By that time, they will also have led to entrepreneurial decisions, and they will require an active participation of the government.

II. Our “basic law” shall be the “Triangle of energy policy objectives”

During the past years, public focus was increasingly on the protection of the world climate. At the present time, many people and institutions are wondering what the international economic system will look like in the future.

The tasks we are commonly facing thus seem to undergo a change. In addition, new challenges appear. These circumstances need to be taken into consideration by the instruments applied, technologies and the ways of living and working.

However, the basis for all that remains unchanged. The cornerstones of the energy industry will still be determined by the triangle of energy policy objectives. Its components (environmental compatibility, security of supply and efficiency) will also in the next decade form the basis of an energy policy that allows for future needs. We, the German energy industry, will continue to use these objectives as a basis for our action.

We are well aware that the aforementioned targets have been given different priorities during the past years. However, we appeal not to shift balances in this well-proven interplay of forces. The mutual balance of the three targets will ensure a future energy supply that is compatible with our environment and our climate, sustainably available or even renewable and within the reach of everyone without detriment to others.

Playing the three targets off against one another will mean for energy policy to reach an impasse; the three targets are too closely interconnected. A disparate extension would lead to a dangerous imbalance which would ultimately not only jeopardize the respective other targets but could also destroy the entire energy and economic basis.
The same applies to climate protection which we explicitly subscribe to. Up to the year 2020, it will be possible to reduce greenhouse gas emissions by 26 percent as compared to the level of 1990, if all means known and economically reasonable for emissions avoidance are utilized. Even a more ambitious reduction by 30 percent seems to be feasible. However, a 30 percent avoidance of carbon dioxide emissions by the year 2020 can only be reached by means of very expensive measures and will thus inevitably have an impact on Germany as a business location. This correlation must not be concealed in public political discussions. The interaction of the different targets cannot be suspended. It must rather be taken into consideration and communicated in any upcoming decision-making process.

We – the companies of the German energy industry with BDEW as their representative – explicitly subscribe to the targets of the three-component triangle. This triangle represents our “basic law” in energy policy terms and we will continue to take this standard as a basis for our activities without any ideological restraint. We rather have markets and market participants in view. They include first and foremost millions of private and major customers at home and abroad, as well as the great variety of our partners in industry and crafts business, and also our hundreds of thousands employees without whom we would not be able to perform our functions in any place throughout Germany. And the real environment which we are using for our products and where we offer our services is also included in this market.

III. Our assessment of the situation up to 2020

The German energy industry has already been working now in liberalized electricity and gas markets for 10 and five years, respectively. We are no strangers to competition and market-oriented thinking. Our activities are carried out within real economy. We attentively follow our customers’ and suppliers’ wishes. We are doing technical research and development. And we endeavour to offer not only our classical portfolio but to open up further business segments by new products and ideas.

These objectives are pursued throughout our sector. Productive and efficient small and medium-sized companies of the energy industry are competing with European and international players. They all unite in achieving their common goal which is to fully meet the requirements of modern energy supply in the future, too.

We would like to give below a short survey of the trends showing in the German energy industry. We are convinced that these trends do not represent short-term developments but that they determine a long-term strategic direction that will even go beyond the year 2020. We would like to play an active part in these development trends and in their extension with a view to being able to offer our products of power, light, heat and mobility in future markets.

The most important experiences of today and resultant trends are listed hereinafter:
• The future of the energy industry will be essentially determined by the requirements of climate protection. The associated promotion of energy efficiency, energy services and renewable energies will offer new and growing market areas to supply companies. The necessary requirements with regard to climate protection are reflected in the increasing importance customers attach to ecological aspects.

• There will be a growing endeavour among consumers to achieve independence in terms of energy and heat supply.

• The general requirements to be met by supply companies will even increase. This will be associated with the demand for energy services. As a result, customer advisory service will considerably gain in importance. This will lead to an increase in competition among supply companies and in their product spectrum which is in line with the requirements of climate change policy.

• Similarly to industry and commerce, private customers and in particular municipalities will increasingly request modern energy services. Particularly the need for energy investments in the public sector, associated with an economic management of public households, implies both potential and challenges to the energy industry.

• The specific energy consumption of residential buildings will considerably decrease. The same applies to sales of fuels for heating purposes. The consumption of fuel oil will be most severely affected by this development. Combined and multivalent heating systems will become established in the heat market. Apart from renewable energy, fossil energy sources play a part as complementary energies. Natural gas will remain the decisive connecting link beyond the year 2020.

• Up until the year 2020, the energy market will be characterized by a continuous increase in energy efficiency, in terms of both generation and consumption. This increase in efficiency will conflict with a growing number of appliances of the information and communication technology and their more intensive utilization.

• Generally, it is to be expected that decentralized generation and application technologies will increasingly gain in importance. This applies to renewable energies but also to combined generation of heat and power, particularly on the basis of biogas and other renewable energy sources.

• Energy productivity will continue to increase also in industry and commerce up to 2020. The energy intensity of production will decrease or be covered by low-carbon generation in sectors that will continue to be energy-intensive. Cross-sectional technologies, such as drives, compressed air and process heat will also show considerably higher energy efficiency.

• However, in the light of the current political and legal framework conditions, the annual maximum load with reliably available generating capacities in Germany will no longer be fully covered in view of the electricity demand to be expected in 2020. This conclusion also applies if current plans for the construction of new fossil-fired power stations with a high probability of being realized are taken into consideration. And it also ap-
plies if great efforts are undertaken to utilize electricity efficiency potentials and if the targets concerning the increase in the share of renewable energies (to 30 percent) and of centralized co-generation (to 25 percent) are achieved. In spite of higher efficiencies, there is a risk that in 2020 a sufficient amount of reliably available generating capacity will no longer exist to cover the annual maximum load. Electricity imports from other countries do not represent an alternative to cover the annual maximum load. According to latest findings, the existing and planned generating capacities in Europe will not be sufficient from 2015 onwards to cover an increased electricity demand in Europe and in Germany. Therefore, we need a regulatory framework that promotes short-term investments, while intensifying at the same time efforts for an improvement of energy efficiency and integration of electricity generated from renewable energies.

IV. Our vision for 2050 – and the path to be followed until 2020…

The influence of these trends is also reflected in our ideas of future energy generation and supply. We will experience a fundamental structural change. A resolute switch to highly efficient energy technologies with low carbon intensity is only one part of that change, but a necessary one. First steps in this direction have already been realized, but they are associated with many others which are developing in parallel. The energy world of the year 2050 will differ widely from that of today. Therefore, we want to reach important landmarks on that way until 2020:

We are working towards carbon-neutral electricity generation

Beyond the year 2020, conventional energy sources like oil, natural gas, coal and uranium (though with different orders of priority) will remain important cornerstones of our energy supply. As a result of enhanced efforts, the conversion of fossil energy sources will get much more efficient and increasingly de-carbonized.

Modern coal power plant technologies will have a positive effect on the efficiencies of our generating plant park that is to be renewed. Important factors in this process will be the successful technical integration of carbon capture and storage and, at the same time, their economically efficient operation.

We will consistently use the potential which co-generation offers with regard to the utilization of power station waste heat.

In 2020, the use of renewable energies will be a matter of course in the business operations of all supply companies. They will be a part of our core business in an integrated electricity market.
Nuclear energy is an indispensable bridge to carbon-neutral energy generation with a high proportion of renewable energy sources. In Germany, nuclear power stations should therefore remain connected to the grid far beyond the year 2020.

**We will establish a smart interconnection of electricity grids**

The interaction of dispersed and centralized generation, the basic problem of fluctuating energy generation from wind, the regional distribution of generation and demand and, last but not least, an integrated European market require that considerable changes be carried out in our current electricity network. To establish at any time a balance between electricity production and electricity demand will continue to be our core task. Feedback of information in “smart” electricity grids and applications will enable peak demands to be attenuated.

On the way to this energy grid of the future, we attach great importance to the development of storage solutions, such as compressed-air and pumped-storage power stations and high-performance batteries as well as electric mobility.

**We will resolutely advance the utilization of heat from CHP systems**

The use of combined heat and power generation (CHP) and heat utilization make already today a substantial contribution to climate protection. The relevant potentials, inter alia in the field of district heat, are not fully utilized yet. Therefore, the development of CHP will be resolutely pushed ahead where it is reasonable in ecological and economic terms.

**We offer natural gas as a reliable energy source of the future.**

Natural gas will continue to be a reliable energy source which combines the principles of the triangle of energy policy targets. It will assume an important function as a bridge to the energy world of the year 2050. Natural gas supply is secure and competitive and also the most environmentally compatible energy source among fossil fuels. It has the advantage of being also available in the form of renewables-based biogas and of being ideally suited for a combination with other renewable energies (such as solar thermal energy). It is and will remain an indispensable source of energy to electricity generation, the heat market and mobility.

At all stages of natural gas transport we will need in future, too, high-performance pipeline grids. At an international level, pipeline projects like “Nord-Stream” through the Baltic Sea and “Nabucco” for the connection to the Caspian area will therefore be pushed forward. Also the use of biogas, investments in the import of liquefied natural gas (LNG) and the extension of storage facilities will enable a secure supply with this important resource to be guaranteed in future, too.
We are not only energy guides but also providers of comprehensive energy services.

Today, buildings account for a major part of end-use energy consumption. Energy-related advisory service for existing buildings and the use of latest application technologies in existing and new buildings enables the energy consumption of buildings to be considerably reduced or even allows net generation. In the buildings market, large climate protection potentials can be realized in a cost-efficient manner. We would like to collaborate in this process, not only with our technical know-how but also as competent service providers that help to mobilize investments urgently required in this sector.

Energy-related advisory service, financing, installation, maintenance and quality assurance are components of an entire chain of economic value added which will turn previous energy supply companies together with their partners into providers of comprehensive services around heat and energy. This does not only apply to the field of new builds but also in particular to the rehabilitation of existing buildings in Germany. Incentive schemes, such as through certificate credits, would provide possibilities to tap further potentials.

We want energy efficiency.

We, the German energy industry, have a great interest in energy efficiency and take an active part in its development. The measures we carry out cooperatively with our partners to increase energy efficiency range from energy supply to operational management and long-term financing. Efficient energy use is a scope of action for us which extends to all fields such as, for example: buildings, heating, cooling, product creation, lighting, mobility, etc.

Innovative technical solutions, such as (bio) natural gas or electric heat pumps, solar heat and dispersed CHP are examples of application in the heat market. Further examples worth mentioning here are energy-efficient electrical and electronic devices in private households and in the commercial sector, LED technology in the lighting sector and, last but not least, compressed air and pumping systems as well as ventilation, cooling and materials handling technology in industry. In all these fields, there are considerable potentials to be realized in terms of energy efficiency improvements which the German energy industry is prepared to support.

We will build a “smart” energy world.

The economic and ecological trends of climate protection will be particularly reflected in the living environment of our cities. The energy industry will actively support this process by means of modern, “smart” technologies and services. If we are speaking today of “smart meters”, we are not far away from “smart grids” and from the vision of building and reconstructing complete “smart cities” until 2020.
We make a contribution to overcoming the dependence on oil in the transport sector.

Already today, the transport sector is an important part of the German energy industry. For instance, neither local tramways nor “InterCityExpress” trains would travel on the rails without our assistance. At the same time, natural-gas driven vehicles make an essential contribution to the reduction of environmental pollution.

However, new developments in private transport are emerging. The number of vehicles driven by electricity or alternative fuels over short and medium distances will further increase. Natural gas, mainly through blending with bio natural gas, continues to provide a high potential for development as a fuel with a very favourable CO₂ balance. As to electric vehicles, we consider a number of approximately one million electric cars on our streets in 2020 to be a realistic figure.

V.1 Our commitment as German energy industry

We are aware of our responsibility. – The recent ecological and social debates were frequently focused on a very short-period of time. The ideas of sustainable and future-oriented management have always been a matter of priority to the German energy industry. Our business would not be possible without that basis. The same applies to small and major companies ranging from local municipal utilities to global groups. We know that decisions and developments for several generations and decades are at stake.

We are able and willing to take resolute action. – Particularly this kind of sustainable management enables us to act during difficult times and continue to invest in the future: for the sake of our customers, our companies and our employees, our national economy and last but not least our environment. We will neither diminish our efforts in climate protection nor in security of supply.

We act in a sustainable and innovative manner. – The challenges and trends described above show that by the year 2020 we will be on the threshold of a new energy age. However, this change will not come about all of a sudden. Therefore, it is advisable to approach this threshold in an evolutionary way. Conventional technologies must be combined with innovative ideas.

We, the German energy industry, therefore undertake - along the lines of sustainable management - to make our visions of the next decade’s energy world within the scope of our project on future energy options to 2020 (“Zukunftenergie 2020”) come true and thus to establish the necessary balance between climate protection, security of supply and efficiency.
V.2 The regulatory framework

Reliable framework conditions are an indispensable requirement for coping with the challenges described. Neither any ideological debates nor a prohibition or exclusion of certain options can help in setting up this forecast. Within our companies, we have defined the strategic direction to follow. We trust in our efficiency and would like to inspire new confidence in our customers and in politics. Likewise, we would like to be able to place new confidence in politics, ranging from individual municipalities to the European level. Stability on the one hand and freedom of action on the other hand are an essential requirement in this respect.

- In this context, we wish to be able to move within a reliable political and regulatory framework that enables the basic elements of the project on “Future energy options to 2020” to be realized.

- Energy policy represents an important element of economic policy and must continue to do so in future. However, energy policy also affects economic energy issues and issues relating to the environment, research work, competition, regulation, European concerns and transport. A complex network has come into being which impedes and prevents consistent decisions to be taken on energy policy. Therefore, it is necessary to concentrate interests and competences. To allow for future needs of Germany’s energy supply it is important to connect economy with ecology and not let them fall apart. This must also be reflected in the political institutions. A possibility in this respect would be at least the establishment of a Cabinet committee (Energy Cabinet of the German Federal Government) including as members from the forthcoming election period the departments relevant in terms of energy policy. The work of this committee may lead to the creation of an independent German Federal Energy Ministry.

- We have been quite familiar with competition and market access for a long time and we want to adhere to that in future. Competition is a matter of course for us in Germany – and must become a matter of course throughout Europe. For this reason, access to the market for new market entrants, for instance, should be taken for granted just like the possibility for established companies to commit themselves to the field of renewable energies by using their expertise. In particular, this non-discrimination must be effective in all markets. It is about time to improve competition throughout the EU internal energy market. This also means that market access and pricing need to be implemented in our neighbouring countries in an open and transparent manner as is already the case in Germany for foreign competitors.

- Germany’s voice is of importance within Europe. Already today, approximately 75 percent of laws and regulations relevant to the German energy market are developed and decided in Brussels. Therefore, it is necessary that German interests are more strongly represented within the European Union.

- Investments are required in many fields of the energy industry: for modernizations, replacements, extension of existing and substitution of outdated structures. To this end, a reliable political and legal framework is needed. Particularly during tense economic
situations like at the present time, our country needs a positive discussion about **investments in infrastructures**, such as in the construction of power stations, storage facilities and lines. This must be associated with project approval and authorization procedures which take legitimate objections into consideration but which also help to overcome barriers. But it is also of decisive importance that the regulatory framework allows an adequate return on capital employed. A regulatory framework which does not take account of this requirement prevents necessary investments and thus impairs security of supply in Germany.

- The private-sector commitment of the German energy industry in the worldwide **energy resources** market benefits our country’s security of supply. Strong, internationally influential companies in global competition need political support to be on a par with their international partners in future negotiations and to be able to pursue innovative plans in the world markets.

- International endeavours of **climate protection** need as well political support. Emissions trading has to be extended to other sectors and regions. Uniform emissions trading throughout the world with uniform pricing is an efficient and simultaneously market-oriented instrument for effective climate protection. As a first step, the refinement and extension of measures associated with Clean Development Mechanism (CDM) and Joint Implementation (JI) can also play an important part in this process.

- Simultaneously, it is essential both nationally and internationally to take account of the principle according to which any measure in terms of energy policy has to be considered **without giving preference to certain technologies**. The government should not lock in market results through quota. Which technology will prevail on the market should be left to the market itself.

- At the same time it is necessary to strengthen our capability to cope with future needs by **intensifying energy research** which provides innovative solutions for the future. Research is the natural resource of a technology-intensive industrialized country with few raw materials resources like Germany. Energy research is not only a key element for further progress in renewable energies but also for the refinement of existing supply systems and for an increase in efficiency with regard to the generation, processing and utilization of energy.

- Intensified energy research may have an important positive effect on energy application in the next decade in the **mobility sector**. The German industry has every opportunity to defend and even extend its technological leadership in the development of new and spread of well-proven climate-compatible drives and in the reduction of CO₂ emissions.

- But mobility is not the only challenge to future **urban planning**. The general term “smart cities” implies that local politicians, authorities of the German Länder responsible for urban and regional planning and the German Federal Ministry for Transport, Building and Urban Development virtually bear responsibility in this respect. The de-
Development and implementation of schemes for new urban energy infrastructures must become a matter of priority on the political agenda.

VI. Our offer of dialogue

Together we can successfully cope with the large challenges we will have to face in the next decade in terms of energy policy, and continue to maintain the balance between climate protection, security of supply and efficiency. We can reach these goals if appropriate framework conditions are now established for the future. The present Paper describes the relevant key factors which now need to be consolidated and put in concrete terms. We, the German energy industry within the German Association of Energy and Water Industries (BDEW), are prepared to play an active part in the project on future energy options to 2020 (“Zukunftsenergie 2020”). We do not only want to launch this project but also to collaborate in its refinement. Our offers to customers and politics have thus been tabled. We are looking forward to the dialogue about the topics involved and their practical implementation.